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ABSTRACT

Two validity studies were made of the Peabody Individual Achievement Test (PIAT) with 152 learning disabled and 115 non-learning disabled children (ages from 7 to 10 years). In the first study, Ss' scores on the PIAT, California Achievement Test (CAT), and the Wide Range Achievement Test (WRAT) were correlated; in the second study scores on the PIAT and the Metropolitan Achievement Test (MAT) were correlated. Results indicated substantial validity when the PIAT was used with the WRAT, the CAT, or the MAT as criterion measures, with highest correlations observed between the PIAT and the WRAT and lowest correlations found for mathematics subtests. Results suggested the appropriateness of using the PIAT as a time saving individual assessment measure with learning disabled children because its format does not require writing answers or reading mathematics word problems. (DB)

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ACHIEVEMENT SCREENING WITH LEARNING DISABLED CHILDREN

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The diagnosis and educational planning for children who are learning disabled is of major concern in education today. In recent years, standardized tests have been frequently used in educational assessment decisions. Particularly in the area of special education, professionals have depended quite heavily upon test results for classification and placement into specific educational programs. Real questions can be raised, however, regarding the appropriateness of these procedures since the special education population represents a markedly skewed distribution on many of the major achievement tests.

In the assessment of children with learning disabilities, it is frequently low scholastic performance in one area of achievement, contrasted with higher achievement in other areas, which is a clue in the identification procedure. The diagnosis of "learning disability" usuall, implies a discrepancy between potential and actual functioning levels. In order to determine this discrepancy, it is necessary for both potential and actual functioning to be assessed.

In most instances, the capacity or potential of the child to learn is assessed through a measure of intelligence, while

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academic achievement is commonly measured through a comprehensive group measure. It is often impractical, however, to employ extensive test batteries for diagnosis and remediational efforts due to financial, time, and personnel limitations. Emphasis has recently been placed upon the development and evaluation of instruments suitable for use by a broader range of educational personnel. (Bateman and Shiefelbusch, 1970; Mandall, 1970)

Few screening devices are available, however, which provide a means of obtaining academic information about individual students in a short period of time. One such screening instrument is the Wide Range Achievement Test (WRAT) which has served special education for many years as a major individual short-form assessment tool. (Proger, 1970; Lane, 1971) An alternative to the WRAT is the Peabody Individual Achievement Test (PIAT) by Dunn and Markwardt (1970), a relatively new individually administered instrument which appears to have promise as a timesaving educational achievement measure. The PIAT purports to measure performance in the following areas: mathematics, reading recognition, reading comprehension, spelling and general information.

The format of this instrument is quite different, however, from most standardized achievement tests. The PIAT includes an auditory component on the Mathematics subtest not found on other instruments. The Reading Recognition subtest requires that the subject orally identify letters and words. On Reading Comprehension, the child is required to read a passage silently and then choose from four pictures the one which best described what he has read. The Spelling subtest, rather than being "dictated" requires that the child select

from four visually presented choices the correctly spelled word. Another innovation on the PIAT is the inclusion of a subtest to measure the child's general funds of knowledge.

Favorable aspects of the PIAT have been noted by three reviewers. Lyman (1971) recognized that an "impressive amount of work has gone into the development of the PIAT [p.137]" and felt that the general format of the entire test kit was outstanding. Proger (1970) described the instrument as being "superior in its construction and standardization [p.461]." In addition, French (1972) commended the authors for developing an instrument which can be used from kindergarten through high school level. He further noted that the test will be useful screening device in obtaining" . . . a quick, rough estimate of educational levels" and in specifying" . . . the point at which a more comprehensive test may be employed, should a more reliable and thorough estimate be desirable [p.33]."

Certain limitations of the PIAT were also recognized. French (1972) noted that at about the fourth grade, the average raw score differences appeared too small from level to level. Lyman (1971) felt that the PIAT suffered in relation to group administered instruments in terms of validity and reliability. Proger (1972) also recognized the lack of validity evidence.

Few validity studies have been located correlating the PIAT to other achievement measures. Sitlington (1970), as part of a master's thesis, correlated PIAT subtests with those of the WRAT. Forty-six multiethnic educable mentally retarded students, achieving at the

third grade level in Honolulu, Hawaii School District comprised the sample. PIAT-WRAT comparable subtest correlations in arithmetic, spelling, and reading were .58, .85, and .95 respectively.

Soethe (1972) correlated the PIAT achievement scores with comparable WRAT scores on 40 children designated as Normal (N=13), Reading Disabled (N-12), and Mentally Retarded (N=15). The correlations obtained for each of the three groups must be viewed with utmost caution due to the extremely small sample sizes. Consequently, only those coefficients obtained from his total sample will be considered for comparison in the present study. The highest correlation was obtained when comparing PIAT Reading Recognition with WRAT Reading (r=.89). The Spelling subtest produced an r of .74, while PIAT Mathematics and WRAT Arithmetic yielded a correlation coefficient of .63.

Watson (1972) compared the relationship of the PIAT to selected CAT subtests for 94 educable mentally retarded (EMR) and 116 educationally handicapped (EH) students. Correlations were obtained between comparable subtests during a Fall and Spring testing period. Highest correlations, regardless of the testing periods, for the EH sample included: Reading Recognition and Reading Vocabulary, .92; Reading Comprehension, .84; and Mathematics and Arithmetic Fundamentals, .79. In general, slightly lower coefficients were obtained for the EMR sample: Reading Recognition and Reading Vocabulary, .82; Reading Comprehension, .75; and Mathematics and Arithmetic Fundamentals, .74.

Research is needed to evaluate the utility and validity of the

PIAT with other than the normative population which consisted of children attending regular public school classes. The purpose of this paper is to report on two concurrent validity studies in which the results of the PIAT will be compared with three existing achievement tests, the California Achievement Test (CAT), the Metropolitan Achievement Test (MAT), and the Wide Range Achievement Test (WRAT).

Method

Study One (PIAT-CAT-WRAT)

Subjects: The sample consisted of 45 Caucausian children (37 males and 8 females) from middle class socioeconomic stratum who were students at the Research and Evaluation Center for Learning. They were diagnosed as learning disabled by a multidisciplinary diagnostic team, consisting of a pediatrician, psychologist, educational diagnostician, and a speech, hearing, and language pathologist. The children were qualified for enrollment in accordance with the definition of learning disabilities set forth by the National Advisory Committee on Handicapped Children (1968).

Chronological ages of the participating subjects at the time of the study ranged from 7 years, 1 month to 12 years, 9 months with a mean CA of 10 years, 2 months (SD 1 year, 5 months). Wechsler Intelligence Scale for Children Full Scale IQ scores, obtained within one year prior to the study, ranged from 72 to 125 with a mean of 93.0 (SD 10.29).

Procedures: All participating subjects were administered the PIAT, CAT (Upper Primary) and WRAT by a certified school psychologist.

Only CAT subtests reflecting content areas similar to those of the PIAT and WRAT were used for comparison. The PIAT and WRAT Reading subtests were administered individually, while the entire CAT and the WRAT Arithmetic and Spelling subtests were administered in groups of approximately eight subjects each. Test presentation was counterbalanced with subjects being randomly assigned to each presentation group.

Study Two (PIAT-MAT)

Subjects: The sample consisted of 222 fourth grade children enrolled in nine experimental classrooms within the Dallas Independent School District which were selected to represent a broad socioeconomic background. There were 107 LD (63 males and 44 females) and 115 NLD (56 males and 59 females) subjects. The LD children were qualified for placement on the basis of a screening battery administered through the regional education service center (Texas Education Agency, 1973). The NLD children were those considered "adequate achievers" by school personnel from their respective home schools. IQ's, as determined from the California Short Form Test of Mental Maturity, ranged from 85 to 123 for the LD sample and between 85 and 139 for the NLD sample. The mean IQ for the LD sample was 99.4 (SD 8.90) with a mean CA of 9 years, 8 months (SD 5.54). For the NLD sample, the mean IQ was 106.4 (SD 11.94) with a mean CA of 9 years, 7 months (SD 5.29 months). The IQ of the NLD group was significantly greater (t-4.68; df 220; $p < .01$) than that of the LD group.

Procedures: All childr n were administered the PIAT by trained examiners while MAT batteries were administered by the classroom teacher after participation in orientation sessions regarding specific MAT procedures. Both the PIAT and MAT were administered within a one-month time period. The order of testing was counterbalanced so that one-half of both the LD and NLD groups received the PIAT followed by the MAT. The order of test presentation was reversed for the remaining subjects.

Results

Study One (PIAT-CAT-WRAT)

Table 1 presents the correlations of the PIAT with the CAT and WRAT. The correlations ranged from moderate to high (.61 to .90) when using Guilford's (1956) criteria for interpretation of the strength of coefficients and are generally in line with existing reports in the literature. As expected, the highest correlations were observed between the PIAT Reading Recognition and WRAT Reading subtests since both are very similar tests of word recognition. When comparing the PIAT and WRAT mathematics and spelling scores, marked degrees of relationship were also observed, suggesting that the difference in format has little effect on the scores obtained.

In comparing the PIAT to CAT content similar subtests, moderate to high correlations were obtained. In the area of reading, marked relationships were observed when comparing both PIAT subtests with CAT Reading Vocabulary and Total Reading. Marked relationships are also observed when comparing PIAT Mathematics and MAT Arithmetic

Fundamentals and between the two spelling subtests. Substantial, but lesser degrees of relationship were observed between the PIAT Mathematics and CAT Arithmetic Reasoning as well as between the two PIAT Reading subtests and CAT Reading Comprehension.

Study Two (PIAT-MAT)

Greater flexibility of analysis was available in the PIAT-MAT study. Due to the greater N and LD/NLD distribution, data was analyzed by diagnostic classification and by sex. Guilford's (1956) criteria was also followed for interpretation of the correlation coefficients. Table 2 reports correlations for the LD sample. Moderate to high correlations were demonstrated when comparing the PIAT to the MAT. For the LD sample, correlation coefficients ranged from .45 to .86. Marked degrees of relationship were observed between the PIAT and MAT reading scores. Moderate correlations were obtained between the two spelling scores, and between PIAT Mathematics and CAT Arithmetic scores.

Correlation coefficients for the NLD sample is presented in Table 3. Moderate to high correlations were observed in the identical pattern as demonstrated for the NLD sample.

In Table 4, the diagnostic classifications were collapsed to present data by sex of subjects. The same general pattern in the area of mathematics and reading recognition was apparent as previously observed. All obtained correlations indicate substantial to marked degrees of relationship with four exceptions. For LD females and NLD males, only moderate instead of high correlations were observed. The same decrease in magnitude was observed for the spelling subtests for both LD and NLD females.

Discussion and Conclusions

The purpose of the present investigation was to begin to identify the relationship of the PIAT within the matrix of existing group and individually administered achievement tests for a learning disabled population. This endeavor is of critical importance since diagnosis for the LD child may be based on both individual diagnostic study as well as available group achievement data. The question which was posed and attempted to answer was: Is there a correspondence between widely used school achievement measures and an individually administered screening achievement measure? Further, it was attempted to determine whether the relationship was strong enough to conclude the degree to which the two kinds of tests are interchangeable for an LD population.

Results from both studies are indicative of the following conclusions:

1) Substantial validity is demonstrated in support of the PIAT when using the WRAT, the CAT, or the MAT as criterion measures.

2) Highest correlations were observed between the PIAT and WRAT, as expected, since both are screening instruments with relatively few items at any one age or grade level.

3) Sufficiently high correlations were also observed between the PIAT and both the CAT and MAT related subtests, despite the fact that task requirements are quite different.

4) Although correlations between PIAT Mathematics and MAT Arithmetic scores were of lesser magnitude than noted for the corresponding CAT and WRAT subtests, moderate degrees of concomitance were still reflected.

5) With the singular exception of Mathematics, correlations appear relatively high when computed for the NLD sample or for both the LD and NLD groups classified by sex.

In view of the obtained correlations, the PIAT could serve as a marker to delineate academic areas which need diagnostic study. It appears that the PIAT format, although differing from those in traditional assessment instruments, may be particularly advantageous when used with LD children. For example, a child who demonstrates fine motor coordination difficulties may be unfairly penalized when required to respond by writing his answers. On the PIAT, responses may be made merely by pointing to a choice of four alternatives. The PIAT does not require a child to read word problems on the Mathematics subtest; consequently, this may be viewed as a more accurate measure of his ability in that a correct response is independent of reading comprehension abilities. In addition, the overall format appears to provide less formal structure and more interesting test materials to assist in maintaining optimal rapport, and hence, optimal functional level.

It seems clear from that data that the PIAT, designed and standardized with regular elementary school children, is also applicable for use with learning disabled children. It is concluded, therefore that substantial concurrent validity was demonstrated in support of the PIAT, or it appears at least that the PIAT is no more biased or inaccurate than other measures which have been used in achievement assessment in special education.

Clinicians appear to be on relatively safe ground in utilizing the PIAT as an index of current academic functioning for LD children, should they wish. However, the format, interest, and motivational factors inherent in the PIAT may recommend its use in clinical and diagnostic settings.

Further research studies utilizing criterion or domain referenced testing will be important to specify the relationship between these group achievement measures and indices of actual classroom functioning. The ultimate validity is not so much the concurrence among group and individual achievement tests, however, but of prediction of relationships which these tests provide in the classroom.

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Table 1

Correlation Coefficients between

Related PIAT, CAT, and WRAT Subtests

	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
CAT			
Arithmetic Reasoning	.62		
Arithmetic Fundamentals	.71		
Total Arithmetic	.71		
Reading Vocabulary		.84	.71
Reading Comprehension		.65	.61
Total Reading		.81	.71
Spelling			
WRAT			
Arithmetic	.76		
Reading		.90	.78
Spelling			

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	Mathematics	Reading Recognition	Reading Comprehension	Spelling
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Fundamentals	.71			
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nprehension		.65	.61	
ing		.81	.71	
				.73
	.76			
		.90	.78	
				.74

Table 2

Correlation Coefficients between

Related PIAT and MAT Subtests for the LD Sample

MAT	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
Math Computation	.46		
Math Concepts	.50		
Math Problem Solving	.45		
Total Math	.51		
Word Knowledge		.86	.81
Reading		.79	.72
Total Reading		.86	.80
Spelling			

Table 2

Correlation Coefficients between

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	Mathematics	Reading Recognition	Reading Comprehension	Spelling
tation	.46			
pts	.50			
em Solving	.45			
	.51			
edge		.86	.81	
		.79	.72	
ing		.86	.80	
				.68

Table 3

Correlation Coefficients between

Related PIAT and MAT Subtests for the NLD Sample

	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
Math Computation	.56		
Math Concepts	.58		
Math Problem Solving	.58		
Total Math	.64		
Word Knowledge		.76	.73
Reading		.73	.70
Total Reading		.77	.75
Spelling			

Table 3

Correlation Coefficients between

Related PIAT and MAT Subtests for the NLD Sample

	PIAT			
	Mathematics	Reading Recognition	Reading Comprehension	Spelling
ation	.56			
ots	.58			
em Solving	.58			
	.64			
edge		.76	.73	
		.73	.70	
ing		.77	.75	
				.69

Table 4

Correlation Coefficients between

Related PIAT and MAT Subtests by Sex for both the LD and NLD Sampl

MAT	PIAT											
	Mathematics				Reading Recognition				Reading Comprehension			
	LD		NLD		LD		NLD		LD		NLD	
	M	F	M	F	M	F	M	F	M	F	M	
Math Computation	.53	.33	.48	.63								
Math Concepts	.55	.43	.62	.54								
Math Problem Solving	.48	.38	.56	.60								
Total Math	.59	.39	.62	.66								
Word Knowledge					.83	.89	.76	.76				
Reading									.79	.59	.68	
Total Reading					.83	.89	.75	.79	.83	.73	.71	
Spelling												

Table 4

Correlation Coefficients between

Related PIAT and MAT Subtests by Sex for both the LD and NLD Samples

PIAT																
Mathematics				Reading Recognition				Reading Comprehension				Spelling				
LD		NLD		LD		NLD		LD		NLD		LD		NLD		
M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
.53	.33	.48	.63													
.55	.43	.62	.54													
.48	.38	.56	.60													
.59	.39	.62	.66													
				.83	.89	.76	.76									
								.79	.59	.68	.73					
				.83	.89	.75	.79	.83	.73	.71	.78					
												.71	.64	.76	.59	

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In Table 4, the diagnostic classifications were collapsed to present data by sex of subjects. The same general pattern in the area of mathematics and reading recognition was apparent as previously observed. All obtained correlations indicate substantial to marked degrees of relationship with four exceptions. For LD females and NLD males, only moderate instead of high correlations were observed. The same decrease in magnitude was observed for the spelling subtests for both LD and NLD females.

Discussion and Conclusions

The purpose of the present investigation was to begin to identify the relationship of the PIAT within the matrix of existing group and individually administered achievement tests for a learning disabled population. This endeavor is of critical importance since diagnosis for the LD child may be based on both individual diagnostic study as well as available group achievement data. The question which was posed and attempted to answer was: Is there a correspondence between widely used school achievement measures and an individually administered screening achievement measure? Further, it was attempted to determine whether the relationship was strong enough to conclude the degree to which the two kinds of tests are interchangeable for an LD population.

Results from both studies are indicative of the following conclusions:

1) Substantial validity is demonstrated in support of the PIAT when using the WRAT, the CAT, or the MAT as criterion measures.

2) Highest correlations were observed between the PIAT and WRAT, as expected, since both are screening instruments with relatively few items at any one age or grade level.

3) Sufficiently high correlations were also observed between the PIAT and both the CAT and MAT related subtests, despite the fact that task requirements are quite different.

4) Although correlations between PIAT Mathematics and MAT Arithmetic scores were of lesser magnitude than noted for the corresponding CAT and WRAT subtests, moderate degrees of concomitance were still reflected.

5) With the singular exception of Mathematics, correlations appear relatively high when computed for the NLD sample or for both the LD and NLD groups classified by sex.

In view of the obtained correlations, the PIAT could serve as a marker to delineate academic areas which need diagnostic study. It appears that the PIAT format, although differing from those in traditional assessment instruments, may be particularly advantageous when used with LD children. For example, a child who demonstrates fine motor coordination difficulties may be unfairly penalized when required to respond by writing his answers. On the PIAT, responses may be made merely by pointing to a choice of four alternatives. The PIAT does not require a child to read word problems on the Mathematics subtest; consequently, this may be viewed as a more accurate measure of his ability in that a correct response is independent of reading comprehension abilities. In addition, the overall format appears to provide less formal structure and more interesting test materials to assist in maintaining optimal rapport, and hence, optimal functional level.

It seems clear from that data that the PIAT, designed and standardized with regular elementary school children, is also applicable for use with learning disabled children. It is concluded, therefore that substantial concurrent validity was demonstrated in support of the PIAT, or it appears at least that the PIAT is no more biased or inaccurate than other measures which have been used in achievement assessment in special education.

Clinicians appear to be on relatively safe ground in utilizing the PIAT as an index of current academic functioning for LD children, should they wish. However, the format, interest, and motivational factors inherent in the PIAT may recommend its use in clinical and diagnostic settings.

Further research studies utilizing criterion or domain referenced testing will be important to specify the relationship between these group achievement measures and indices of actual classroom functioning. The ultimate validity is not so much the concurrence among group and individual achievement tests, however, but of prediction of relationships which these tests provide in the classroom.

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Table 1

Correlation Coefficients between

Related PIAT, CAT, and WRAT Subtests

	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
CAT			
Arithmetic Reasoning	.62		
Arithmetic Fundamentals	.71		
Total Arithmetic	.71		
Reading Vocabulary		.84	.71
Reading Comprehension		.65	.61
Total Reading		.81	.71
Spelling			
WRAT			
Arithmetic	.76		
Reading		.90	.78
Spelling			

Table 1

Correlation Coefficients between

Related PIAT, CAT, and WRAT Subtests

	PIAT			
	Mathematics	Reading Recognition	Reading Comprehension	Spelling
Reasoning	.62			
Fundamentals	.71			
metic	.71			
abulary		.84	.71	
prehension		.65	.61	
ng		.81	.71	
				.73
	.76			
		.90	.78	
				.74

Table 2

Correlation Coefficients between

Related PIAT and MAT Subtests for the LD Sample

MAT	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
Math Computation	.46		
Math Concepts	.50		
Math Problem Solving	.45		
Total Math	.51		
Word Knowledge		.86	.81
Reading		.79	.72
Total Reading		.86	.80
Spelling			

Table 2

Correlation Coefficients between

Related PIAT and MAT Subtests for the LD Sample

	PIAT			
	Mathematics	Reading Recognition	Reading Comprehension	Spelling
ation	.46			
ts	.50			
m Solving	.45			
	.51			
dge		.86	.81	
		.79	.72	
ing		.86	.80	
				.68

Table 3

Correlation Coefficients between

Related PIAT and MAT Subtests for the NLD Sample

	PIAT		
	Mathematics	Reading Recognition	Reading Comprehension
Math Computation	.56		
Math Concepts	.58		
Math Problem Solving	.58		
Total Math	.64		
Word Knowledge		.76	.73
Reading		.73	.70
Total Reading		.77	.75
Spelling			

Table 3

Correlation Coefficients between

Related PIAT and MAT Subtests for the NLD Sample

	PIAT			
	Mathematics	Reading Recognition	Reading Comprehension	Spelling
ation	.56			
ts	.58			
m Solving	.58			
	.64			
edge		.76	.73	
		.73	.70	
ng		.77	.75	
				.69

Table 4

Correlation Coefficients between

Related PIAT and MAT Subtests by Sex for both the LD and NLD Sample

MAT	PIAT										
	Mathematics				Reading Recognition				Reading Comprehension		
	LD		NLD		LD		NLD		LD		NLD
	M	F	M	F	M	F	M	F	M	F	M
Math Computation	.53	.33	.48	.63							
Math Concepts	.55	.43	.62	.54							
Math Problem Solving	.48	.38	.56	.60							
Total Math	.59	.39	.62	.66							
Word Knowledge					.83	.89	.76	.76			
Reading									.79	.59	.68
Total Reading					.83	.89	.75	.79	.83	.73	.71
Spelling											

Table 4

Correlation Coefficients between

Related PIAT and MAT Subtests by Sex for both the LD and NLD Samples

PIAT															
Mathematics				Reading Recognition				Reading Comprehension				Spelling			
LD		NLD		LD		NLD		LD		NLD		LD		NLD	
M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
.53	.33	.48	.63												
.55	.43	.62	.54												
.48	.38	.56	.60												
.59	.39	.62	.66												
				.83	.89	.76	.76								
								.79	.59	.68	.73				
				.83	.89	.75	.79	.83	.73	.71	.78				
												.71	.64	.76	.59